

WHAT IS CLAIMED IS:

1. A yarn, fiber or filament which can be woven without sizing, characterized in that a grafted copolymer is present over at least a portion of the surface of the yarns, fibers and filaments, the grafted copolymer comprising at least three sequences with different chemical natures, including one or more sequence(s) for anchoring to solids, one or more sequence(s) with a hydrophobic nature and one or more sequence(s) with a hydrophilic nature, composed of:
- a) 1 to 80% by weight, preferably 5 to 40% by weight, of one or more sequence(s) for anchoring to solids composed of an aromatic, cycloalkyl or linear or branched hydrocarbon chain comprising basic nitrogenous groups of the following type: heterocyclic,  $-NH_2$ ,  $-NH-$ ,  $-NHR$  or  $-NR_2$ ,  $-CONH_2$ ,  $-CONHR$ ,  $-CONR_2$  (where R is a  $C_1$ - $C_6$  alkyl radical, optionally substituted by one or more  $-OH$ ,  $-COO-$ ,  $-CO-$ ,  $-O-$  or  $-SO_3H$  groups), which can comprise  $-COO-$  groups, the content by weight of basic nitrogenous monomers in the anchoring chain being at least 5% and preferably 30%, and
- b) at least 10% by weight, preferably 25 to 80% by weight, of one or more sequence(s) with a hydrophobic nature composed of an aromatic, cycloalkyl or linear or branched hydrocarbon chain which can comprise  $-COO-$ ,  $-S-$ ,  $-F$  or  $-Si(OR')_n(R'')_{2-n}$  groups (where  $R'$  and  $R''$  represent alike or different  $C_1$ - $C_{10}$  alkyl or aryl radicals and  $n = 0$  to 2) and formed of monomer units, the solubility parameter of which is less than or equal to  $21.5 J^{1/2}/cm^{3/2}$ , preferably less than  $19 J^{1/2}/cm^{3/2}$ ,

c) at least 10% by weight, preferably 15 to 70% by weight, of one or more sequence(s) with a hydrophilic nature composed of a linear or branched hydrocarbon chain comprising -O-, -OH, -NCO, -COO-, -COOH, -CONH<sub>2</sub>, -CONHR''' (where R''' is a C<sub>1</sub>-C<sub>3</sub> alkyl radical), -NH-, -S- or -SO<sub>3</sub>H groups and formed of monomer units, the solubility parameter of which is greater than 22 J<sup>1/2</sup>/cm<sup>3/2</sup>, preferably greater than 22.5 J<sup>1/2</sup>/cm<sup>3/2</sup>.

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2. The yarn, fiber or filament as claimed in claim 1, characterized in that the molecular weight of the anchoring sequence(s), of the sequence(s) with a hydrophobic nature and of the sequence(s) with a hydrophilic nature of the grafted copolymer is less than or equal to 10 000.

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3. The yarn, fiber or filament as claimed in claim 1 or 2, characterized in that the anchoring sequence(s) of the grafted copolymer comprises basic nitrogenous groups introduced from one or more compound(s) chosen from:

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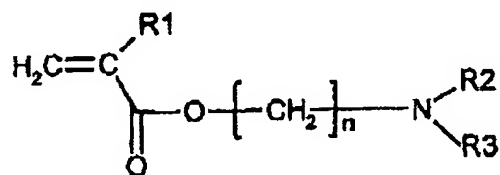
a) - vinylpyridines, such as 2-vinylpyridine, 3-vinylpyridine, 4-vinylpyridine or 2-methyl-5-vinylpyridine,  
- vinylimidazole, 2-methyl-N-vinylimidazole, vinylcarbazole, N-vinylpyrrolidone, 3-methyl-N-vinylpyrazole, 4-methyl-5-vinylthiazole, N-vinylcaprolactam or ethylimidazolidone methacrylate,  
- (meth)acrylamides, such as (meth)acrylamide, N-methylacrylamide, N-isopropylacrylamide and N,N-dimethylacrylamide,  
- N-methylol(meth)acrylamide, N,N-dimethylol(meth)acrylamide, 2-acrylamido-2-methyl-1-propanesulfonic acid, diacetone acrylamide,

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methyl 2-acrylamido-2-methoxyacetate or N,N,N-tris(hydroxymethyl)methacrylamide,  
- aminoalkyl (meth)acrylates of following formula



where R<sub>1</sub> is a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl radical, R<sub>2</sub> and R<sub>3</sub>, which are identical or different, each represent a C<sub>1</sub>-C<sub>6</sub> alkyl radical and n = 0 to 6,

said nitrogenous groups being, in this first case, introduced by radical copolymerization of one or more abovementioned unsaturated ethylenic monomer(s), and

b) - N,N-diethyl-1,4-butanediamine, 1-(2-aminoethyl)piperazine, 2-(1-pyrrolidyl)ethylamine, 4-amino-2-methoxypyrimidine, 2-(dimethylamino)ethanol, 1-(2-hydroxyethyl)piperazine, 4-(2-hydroxyethyl)morpholine, 2-mercaptopyrimidine, 2-mercaptobenzimidazole, N,N-dimethyl-1,3-propanediamine, 4-(2-aminoethyl)pyridine, N,N-diallylmelamine, 3-amino-1,2,4-triazole, 1-(3-aminopropyl)imidazole, 4-(2-hydroxyethyl)pyridine, 1-(2-hydroxyethyl)imidazole or 3-mercapto-1,2,4-triazole,

said nitrogenous groups being, in this second case, attached to a linear or grafted copolymer by taking advantage of the reactive functional groups introduced along the preformed chain.

4. The yarn, fiber or filament as claimed in one of the

preceding claims, characterized in that the sequence(s) with a hydrophobic nature of the grafted copolymer are formed from monomer units chosen from:

- 5       - (meth)acrylic acid esters, such as methyl (meth)acrylate, ethyl (meth)acrylate, propyl (meth)acrylate, butyl (meth)acrylate, hexyl (meth)acrylate, cyclohexyl (meth)acrylate, ethylhexyl (meth)acrylate, octyl (meth)acrylate, nonyl (meth)acrylate, isodecyl (meth)acrylate, 10       lauryl (meth)acrylate, stearyl (meth)acrylate, pentadecyl (meth)acrylate, cetyl (meth)acrylate, behenyl (meth)acrylate or 3-(trimethoxysilyl)propyl (meth)acrylate,
- 15       - vinyl esters, such as vinyl acetate, vinyl propionate, vinyl butyrate, vinyl sorbate, vinyl hexanoate, vinyl ethylhexanoate, vinyl laurate or vinyl stearate,
- 20       - styrene and alkylstyrenes, such as  $\alpha$ -methylstyrene, vinyltoluene or tert-butylstyrene,
- dienes, such as butadiene or isoprene, which can be hydrogenated after polymerization,
- alkylenes, such as ethylene or propylene,
- siloxanes, such as dimethylsiloxane, diphenylsiloxane or methylphenylsiloxane,
- 25       - fluorinated compounds, such as trifluoroethyl (meth)acrylate, pentafluoropropyl (meth)acrylate, heptafluorobutyl (meth)acrylate, octafluoropentyl (meth)acrylate, pentadecafluorooctyl (meth)acrylate, eicosafluoroundecyl (meth)acrylate, 30       (meth)acrylate, vinyl fluoride or tetrafluoroethylene,

or products of polycondensation, polyesters or polyamides.

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5. The yarn, fiber or filament as claimed in one of the

preceding claims, characterized in that the sequence(s) with a hydrophilic nature of the grafted copolymer are formed from monomer units chosen from:

- ethylene oxide,
- 5     - acrylic acid, methacrylic acid, maleic acid, fumaric acid or itaconic acid,
- acrylamide derivatives, such as (meth)acrylamide, N-methylacrylamide or N-isopropylacrylamide,
- ethyleneimine,
- 10    - vinyl alcohol,
- vinylpyrrolidone or vinylmethyloxazolidone,
- vinylsulfonate,
- sodium methallylsulfonate,
- glycerol methacrylate.

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6. The yarn, fiber or filament as claimed in one of the preceding claims, characterized in that the grafted copolymer comprises:

- a main chain for anchoring to solid particles comprising dialkylaminoethyl (meth)acrylate, 20     N,N-dimethylacrylamide, 2-vinylpyridine or 4-vinylpyridine groups, alone or as a mixture,
- one or more hydrophilic poly(ethylene oxide) grafts, and
- 25    - one or more hydrophobic grafts based on alkyl (meth)acrylates or vinyl esters, alone or copolymerized with styrene or alkylstyrene derivatives, fluorinated monomers, such as tri-fluoroethyl methacrylate, or 3-(trimethoxysilyl)- 30     propyl methacrylate.

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7. The yarn, fiber or filament as claimed in one of the preceding claims, characterized in that it is based on thermoplastic polymer.

8. The yarn, fiber or filament as claimed in claim 7,

characterized in that it is based on polyester or on polyamide.

- 5 9. The yarn, fiber or filament as claimed in one of the preceding claims, characterized in that the grafted copolymer represents between 0.1 and 5% by weight, with respect to the weight of the yarn.
- 10 10. The yarn, fiber or filament as claimed in claim 9, characterized in that the grafted copolymer represents between 0.2 and 2% by weight, with respect to the weight of the yarn.
- 15 11. The yarn, fiber or filament as claimed in one of the preceding claims, characterized in that the overall count of the yarn is between 200 and 950 dtex.
- 20 12. The yarn, fiber or filament as claimed in one of the preceding claims, characterized in that the strand count of the yarn is between 1.5 and 7 dtex.
- 25 13. A process for the preparation of the yarn, fiber or filament as claimed in one of claims 1 to 12, comprising the following stages:
  - 25 1) spinning the constituent material of the yarn,
  - 2) optionally drawing the yarn,
  - 3) optionally texturing the yarn,
  - 4) treating the yarn using a liquid comprising the grafted copolymer defined as claimed in one of
  - 30 claims 1 to 12.
- 35 14. The process as claimed in claim 13, characterized in that the material is a thermoplastic polymer and in that stage 1) is a melt spinning of the polymer.
15. The process as claimed in claim 13 or 14,

characterized in that stage 4) is carried out after stages 2) and 3).

5 16. The process as claimed in claim 13 or 14, characterized in that stage 4) is carried out before stages 2) and 3).

10 17. The process as claimed in one of claims 13 to 16, characterized in that the liquid is a lubricating composition.

15 18. The process as claimed in one of claims 13 to 17, characterized in that the grafted copolymer represents between 5 and 35% by weight, with respect to the weight of the liquid, preferably between 10 and 20%.

20 19. A fabric, characterized in that it comprises at least in part the yarn, fiber or filament as claimed in one of claims 1 to 12 or the yarn, fiber or filament obtained by the process as claimed in one of claims 13 to 18.

25 20. A process for the preparation of a warp and weft fabric as claimed in claim 19, comprising the weaving carried out on a loom, at least a portion of the warp yarns being the yarn as claimed in one of claims 1 to 12 or the yarn, fiber or filament obtained by the process as claimed in one of claims 30 13 to 18.

21. The process as claimed in claim 20, characterized in that it does not comprise a sizing stage.

35 22. The process as claimed in claim 20 or 21, characterized in that the loom is a dry loom, such

as an air jet loom, a rapier loom or a gripper-projectile loom.

- 5        23. The use of the yarn, fiber or filament as claimed in one of claims 1 to 12 or of the yarn, fiber or filament obtained by the process as claimed in one of claims 13 to 18 in producing fabrics for airbags.
- 10       24. The use of fabric as claimed in one of claims 1 to 12 or of the yarn, fiber or filament obtained by the process as claimed in one of claims 13 to 18 in the manufacture of airbags.